AMENDMENT NO. 2 OCTOBER 2021

TO

IS 16490 : 2016 LED DESTINATION BOARD SYSTEM FOR BUSES — SPECIFICATION

(*Page* 7, *clause* **7.2**) — Insert the following at the end:

ANNEX A

(*Clause* 7.2)

ADDITIONAL FUNCTIONAL REQUIREMENTS OF PIS BOARDS

A-1 USABILITY/FUNCTIONALITY/CAPABILITY:

A-1.1 All drivers related interfaces (input/output/feedback) to be provided on controller:

a) the route programming files to be uploaded on controller;
b) route selection function is to be provided on controller; and
c) all driver related route information to be displayed on controller display.

A-1.2 Display Characteristics

a) capability to show customized graphics;
b) two lines English /one line local language;
c) total display height should accommodate two lines in English language and the Individual heights of each line should be adjustable to enable one line to be larger/smaller than the second line. However during next stop announcement only single line text is required; and
d) it should be able to display special signs like signs for ‘Persons With Disabilities enable bus’, ‘ladies special’, etc.

Price Group 1

A-1.3 Display and voice announcement in English and local languages using Microsoft fonts (or any other as specified by customer) through window based software package. This requirement applies only for LDBS controller types as defined in **4.3.1 (b), 4.3.1 (c) and 4.3.1 (d)**

A-1.4 The system should have a programming capability as under:

a) minimum 75 routes UP and DOWN (150 numbers of destinations) on front, side and rear signs with easy sorting of routes. Last selected route must be retained in memory of controller and should appear automatically on power reset;

NOTE — Messages on other sign should not be disturbed/malfunction, it shall function normally as expected.

b) GPS triggered next stop display on Inner sign with synchronized voice announcement for minimum 75 stops on each route. This requirement applies only for LDBS Controller types as defined in **4.3.1 (b), 4.3.1 (c) and 4.3.1 (d)**;

c) the inner sign should be able to display and announce up to three languages, one after the other in sequence. For example make display and announcement in English, then Hindi to be followed by local language for benefit of the passengers. Display and announcements should be possible “before arrival” of the bus at the bus stop, “on arrival” of the bus at bus stop and “after departure” of the bus from the bus stop. This requirement applies only for LDBS controller types as defined in **4.3.1 (b), 4.3.1 (c) and 4.3.1 (d)**;

d) in event of GPS failure the above functionality should be possible through manual intervention on ‘Controller’. This requirement applies only for LDBS Controller types as defined in **4.3.1 (b), 4.3.1 (c) and 4.3.1 (d)**;

e) display driver and conductor ID once in between the stops on Inner sign. This requirement applies only for LDBS Controller types as defined in **4.3.1 (b), 4.3.1 (c) and 4.3.1 (d)**;

f) inner sign should be able to display text and customized graphics and announce up to pre-recorded messages by driver selecting 1~9 on display panel of the ‘Controller’. This requirement applies only for LDBS Controller types as defined in **4.3.1 (d);**

g) display customized graphics plus synchronized voice announcement — preferably location based in case of Million plus population cities —

location based. This requirement applies only for LDBS Controller types as defined in **4.3.1 (b), 4.3.1 (c) and 4.3.1 (d);**

h) functionality of display 'clock'-GPS based or 'Default Messages' on Inner sign. This requirement applies only for LDBS Controller types as defined in **4.3.1 (b), 4.3.1 (c) and 4.3.1 (d)**; and

j) emergency 'stop' request function-by pressing an emergency switch placed anywhere in the bus the inner sign should display 'stop' message and buzzer located near the driver makes the sound alerting the driver to stop the bus. This requirement applies only for LDBS Controller types as defined in **4.3.1 (b), 4.3.1 (c) and 4.3.1 (d)**

A-1.5 Two way communication with central control centre via LDBS controller (The requirement mentioned below in **A-1.5** (a) to **A-1.5** (c) applies only for LDBS controller types as defined in **4.3.1(b), 4.3.1(c) and 4.3.1(d)**:

a) it should be possible to change/choose/select a 'route' remotely over the air from back office and provide current route information to back office;

b) it should be possible to transmit adhoc messages (English) from back office to internal sign;

c) back office should be able to check, through controller, the version of firmware loaded on the signs;

d) controller should be able to transmit pre-configured emergency messages to control centre on RS 232; and

e) controller should enable PIS Health Monitoring remotely from control centre.

A-1.6 Sign should be able to store 'diagnostic trouble codes' (DTC)',' parameters identifiers (PID) and data should be retrievable.

A-1.7 In case any one or more signs get disconnected (malfunction), the rest of the signs should continue to function regardless (including fresh communication from çontroller').

A-2 DIMENSIONS AND TECHNICAL SPECIFICATIONS OF DESTINATION SIGNS

A-2.1 LED and display quality front, side and rear signs:

a) UV resistant, diffused lens 4 mm (min) or 'SMT PLCC2 standard package'; and

b) wide viewing angle 120º horizontal and 60º Vertical.

A-2.2 LED and display quality inner sign shall be placed such as viewing angle for LED shall be 45° all around.

A-2.3 Structure

a) *Front, side and rear signs* — Light weight structure with toughened glass fixed with UV resistant adhesive in front; and

b) *Inner sign* — Light weight structure with poly glass/acrylic/toughened glass.

A-3 TECHNICAL SPECIFICATIONS OF 'PIS CONTROLLER'

a) ethernet, CAN [only for **4.3.1 (d)** of **4.3.1**]; and

b) in built/external two channel amplifier min 10 W rms each suitable for 4 ~8 Ω impedance with input for External Microphone [For **4.3.1 (b), 4.3.1 (c)** and **4.3.1 (d)**].

(TED 28)

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